Name: KEY Hour: _____ Date: _____

NOTES: Section 2.3 – Graph Equations of Lines

Goals: #1 – I can graph linear equations from slope-intercept form.

#2 – I can graph linear equations from standard form.

#3 – I can graph horizontal and vertical lines.

#4 – I can graph linear equations from any form.

  

Homework: Lesson 2.3 Worksheet

Warm Up:

1. Find the slope of the line passing through the points. Then tell whether the lines *rises, falls, is horizontal* or *is vertical.*
   a. (7, 8), (−8, 8)

$m = \frac{8-8}{7-(-8)} = \frac{0}{15} = 0$ horizontal

2. Tell whether the lines are *parallel, perpendicular,* or *neither.*
   a. Line 1: through (−9, 3) and (0, 4)

      Line 2: through (3, −4) and (2, 5)

Line 1: $m = \frac{4-3}{0-(-9)} = \frac{1}{9}$ perpendicular

Line 2: $m = \frac{5-(-4)}{2-3} = \frac{9}{-1} = -9$

3. A skateboard ramp has a run of 24 feet and a rise of 2 feet. What is the slope of the ramp?

$\frac{2}{24} = \boxed{\frac{1}{12}}$

Exploration #1: Work with a partner.

1. What does the *slope-intercept form* of a line mean?

2. What do all the variables represent?

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Notes:

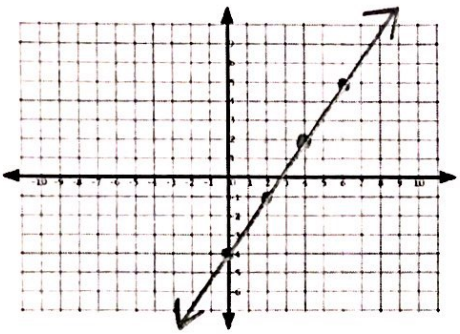
Any linear equation in the form $y = mx + b$ is said to be in slope-intercept form.

slope ↵ ↳ y-intercept

Example #1: Graph the following equations:

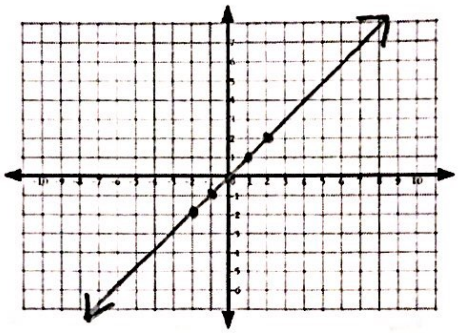
1. $y = \frac{3}{2}x - 4$

slope: $\frac{3}{2}$ y-int: -4



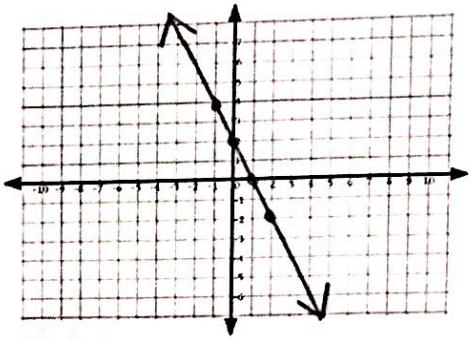
2. $y = x$

slope: 1 y-int: 0



3. $y = -x + 2$

slope: -1 y-int: 2

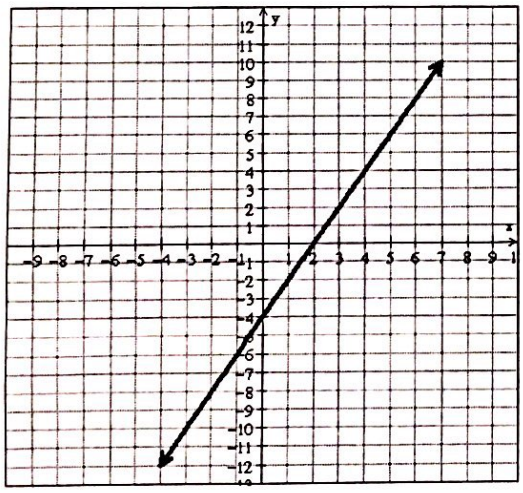


Exploration #2: Work with a partner.

1. What do you know about an *x-intercept*?

2. What do you know about a *y-intercept*?

3. What would the *x*- and *y*-intercepts of this graph be? Write as an ordered pair.



x-intercept: (2, 0)

y-intercept: (0, -4)

4. What does the *standard form* of a line mean?

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Notes:

The x-intercept is the point where a graph intersects the x-axis. The y value for the x-intercept is always 0. (#, 0)

The y-intercept is the point where a graph intersects the y-axis. The x value for the y-intercept is always 0. (0, #)

Any linear equation in the form $Ax + By = C$ is said to be in standard form.

Example #2: Find the x- and y-intercepts of the line with the given equation. Write your intercepts as ordered pairs.

1. $x - y = 3$

x-int: (y = 0)
$x - 0 = 3$
$x = 3$

x-intercept: (3, 0)
y-intercept: (0, -3)

y-int: (x = 0)
$0 - y = 3$
$-y = 3$
$y = -3$

2. $2x + 4y = 16$

x-int: (y = 0)
$2x + 4(0) = 16$
$2x = 16$
$x = 8$

x-intercept: (8, 0)
y-intercept: (0, 4)

y-int: (x = 0)
$2(0) + 4y = 16$
$4y = 16$
$y = 4$

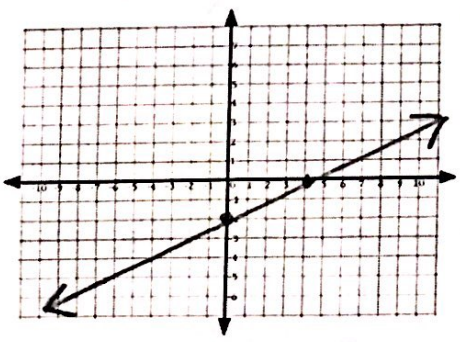
Example #3: Graph the following equations using its x- and y- intercepts. Write your intercepts as ordered pairs.

1. $3x - 6y = 12$

x-int: (y = 0)
$3x - 6(0) = 12$
$3x = 12$
$x = 4$

x-intercept: (4, 0)
y-intercept: (0, -2)

y-int: (x = 0)
$3(0) - 6y = 12$
$-6y = 12$
$y = -2$

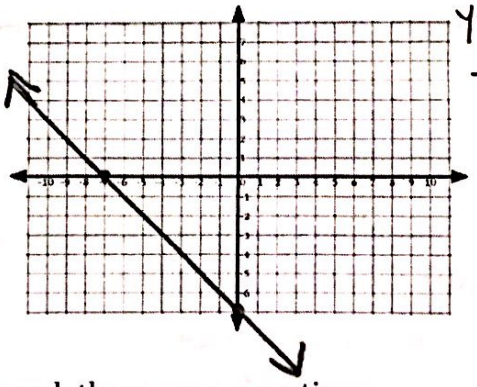


2. $-x - y = 7$

x-int: (y = 0)
$-x - 0 = 7$
$-x = 7$
$x = -7$

x-intercept: (-7, 0)
y-intercept: (0, -7)

y-int: (x = 0)
$-0 - y = 7$
$-y = 7$
$y = -7$



CHALLEGE: Try and come up with different methods to graph those same equations.

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Exploration #3: Work with a partner.

1. Draw some *vertical* lines. How could you model this line?

2. Draw some *horizontal* line. How could you model this line?

CHALLENGE: What are the slopes of the lines you drew?

Notes:

Equations of vertical lines are written as: $x = \#$.

Picture: ↕

Equations of horizontal lines are written as: $y = \#$.

Picture: ↔

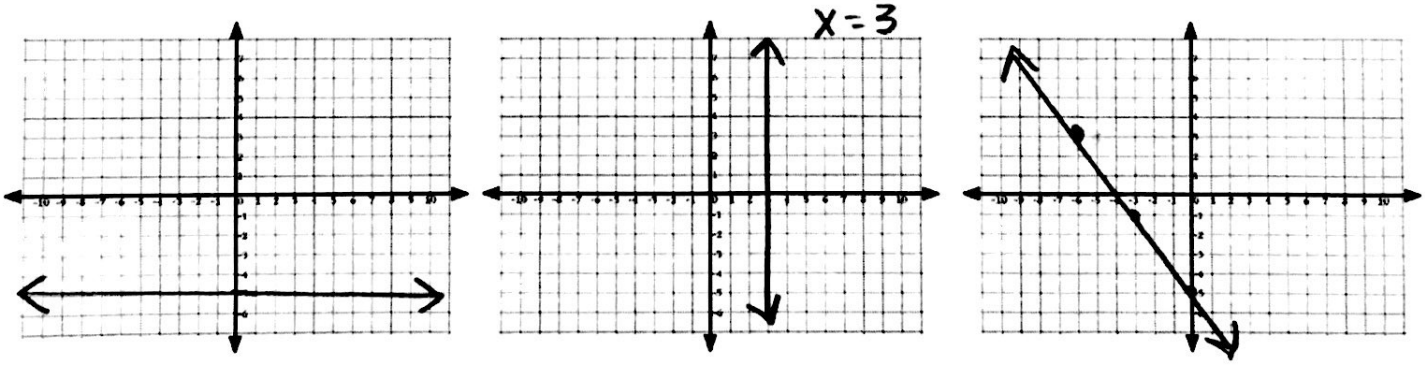
$4x = -15 - 3y$
$+3y \quad +3y$
$3y + 4x = -15$
$-4x \quad -4x$
$\frac{3y}{3} = \frac{-4x-15}{3}$
$y = -\frac{4}{3}x - 5$

Example #4: Graph the following lines using any method.

1. $y = -5$

2. $7x = 21$ $\frac{7x}{7} = \frac{21}{7}$ $x = 3$

3. $4x = -15 - 3y$



Example #5: Rewrite the equations in the form that we could use to graph the line. You DO NOT need to graph the line.

1. $-4x = 3y + 24$
$-3y \quad -3y$
$-3y - 4x = 24$
$+4x \quad +4x$
$\frac{-3y}{-3} = \frac{4x+24}{-3}$
$y = -\frac{4}{3}x - 8$

2. $\frac{-8y}{-8} = \frac{2x+11}{-8}$
$y = -\frac{2}{8}x - \frac{11}{8}$
$y = -\frac{1}{4}x - \frac{11}{8}$